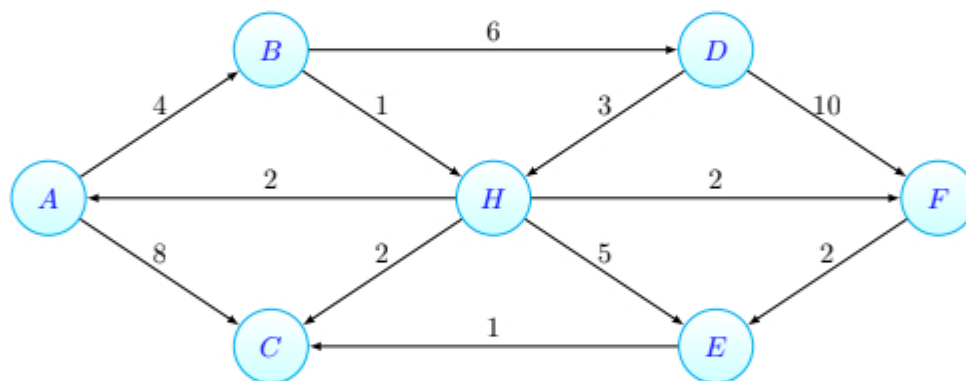


**Instructions:** This quiz is open book and open note. You **may** post clarification questions to Piazza, with the understanding that you may not receive an answer in time and posting does count towards your 30 minutes. Questions posted to Piazza **must be posted as PRIVATE QUESTIONS**. Other use of the internet, including searching for answers or posting to sites like Chegg, is strictly prohibited. Violations of these grounds to receive a 0 on this quiz. Proofs should be written in **complete sentences**. **Show and justify all work to receive full credit.**

---

**Standard 15.** Consider the following directed, weighted graph  $G$ . At the first iteration of Dijkstra's Algorithm, using  $A$  as the source vertex, we examine both the  $(A, B)$  and  $(A, C)$  edges by placing them into a priority queue. However, only  $(A, B)$  is selected at the first iteration.



- (a) What are the next five edges **selected** by Dijkstra's algorithm? After these have been selected, what are the distances from  $A$  that the algorithm has recorded for each vertex in  $G$ ?

**Solution:** There are two possible solutions:

- Solution 1: BG, GF, FE, EC, BD. In this case, the distances are:

$$d(A, B) = 4$$

$$d(A, D) = 10$$

$$d(A, G) = 5$$

$$d(A, F) = 7$$

$$d(A, E) = 9$$

$$d(A, C) = 10$$

- Solution 2: BG, GC, GF, FE, BD. In this case, the distances are:

$$d(A, B) = 4$$

$$d(A, D) = 10$$

$$d(A, G) = 5$$

$$d(A, C) = 7$$

$$d(A, F) = 7$$

$$d(A, E) = 9$$

Review the course notes for details as to how Dijkstra's algorithm works.